"Improving Alaska's quality of transportation through technology application, training, and information exchange."

TECHNOLOGY FOR

Alaskan Transportation

Local Technical Assistance Program

Winter 2002
October–December
Volume 27, Number 4

In this issue . . .

Late Autumn Kenai Peninsula Flooding Causes Significant Damage

Deep Creek bridge abutment failure on the Sterling Highway. Inadequate bank protection for a flood of this magnitude may be partially at fault.

In late October, 2002, and again in November, the rain just wouldn't stop on the lower Kenai Peninsula. Creeks transformed into rivers, and rivers became raging torrents. Washed out bridges, culvert failures, road damage, mud slides, and property damage are the result of the devastating event.

Alaska Department of Transportation & Public Facilities maintenance crews responded immediately but had to wait for the water to drop before significant repairs could begin.

Roads to Homer were closed for nearly 5 days during the October flood, and again for over a day during the second flood in November.

Repair efforts were initially hampered by continuing rainfall. "It was an unbelievable amount of water," reported Carl High, DOT & PF Maintenance Superintendent

continued on page 2

Flood continued

for the Peninsula District. "After Deep Creek crested it came down 11 feet in 24 hours. Those first five days we worked pretty much around the clock," High added, "I had to practically force guys to go get some rest. Everything is as good as we can get it for the winter but there will be a lot more follow up work next season."

State of Alaska transportation infrastructure damage is estimated at 13 million dollars, while the Kenai Peninsula Borough sustained another 1.25 million dollars of damage to their system. Private homes, roads, bridges, and land also sustained significant damage, according to borough personnel, and are not included in the previously mentioned estimate.

The U.S. Geological Survey's Water Resources Division, (USGS) is still calculating the flood statistics designation, but indicated flood peaks on the Homer area streams may have reached levels that statistically occur once every 100 years or more. This was indeed a flood of record proportions. In fact, for as long as the area streams have been monitored, water levels on many of the streams have not been higher. USGS refers to these floods as the "flood of record" for the stream.

Kenai River flood was no picnic! The photograph above illustrates bed load deposit covering the picnic table legs at the Silver King Campground on the Anchor River. Theft chains prevented the table from being washed downstream.

The South Fork of the Anchor River engulfs the North Fork Road near Homer. If you look closely you'll see the bridge lost the south abutment.

The top photo shows culvert buoyancy failure on Stariski Creek on the Sterling Highway. (Buoyancy failures can occur when water backs up over a culvert, trapped air in the culvert makes the culvert act like a cork, popping out from under the embankment.)

The photo on the right shows the North Fork of the Anchor River where it flowed over the Nikolaevsk Village Road, resulting in culvert failure and road wash out.

Bottom left photo: An obvious abutment failure left the Ninilchik River Bridge precariously balanced on two timber columns. Mission Village Road access was reestablished and the bridge was miraculously salvaged.

Announcements

Alaska T2 Training Notification Listserve Sign Up Today!

Alaska Technology Transfer is pleased to announce our new training listserve open to Federal, State, and local transportation agencies - including consultants, contractors, and other transportation professionals. Now you can receive updated training information every few weeks.

To subscribe to the listserver via a web browser connect to the following address:

http://jnumail17.state.ak.us/guest/RemoteListSummary/DOT_Training_Notification_list

Alaska T2 Build a Better Moosetrap

Due to the success of other LTAP "Mousetrap" programs across the country, Alaska is implementing a mousetrap program Alaska style: entitled "Build a Better Moosetrap." If you have an innovative working idea submit the following form to Alaska T2. Published moosetraps will receive a certificate of achievement and be eligible for the Alaska Moosetrap of the Year award.

Build a Better Moosetrap Submittal form

Name of the Better Moosetrap _____

Submitter's Name _____

Title _____

Agency _____

E-mail Address _____

Address _____

Phone Number _____

Developer's Name _____

Title _____

Agency _____

E-mail Address _____

Address _____

Phone Number _____

Description of the Better Moosetrap

Why did you build it?_____

_____

_____

_____

How does it work?

_____

_____

_____

How was it built? (please send photos and drawings)

_____

_____

_____

How does it perform?

_____

_____

_____

The Better Moosetrap award will be given each quarter to the most innovative working idea submitted by a public agency and published in *Alaskan Transportation.*

Award

The best concepts will be published in the *Alaskan Transportation* newsletter and posted on the DOT&PF web page. Published Moosetraps will also receive a special certificate.

Eligibility

City, state, and borough transportation agencies are eligible.

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Optimization of Anti-Icing & Sanding Operations via Mobile Data Collection in Southeast Alaska

By Clint Adler, AKDOT&PF Research Engineer

In many coastal areas of Alaska, the Alaska Department of Transportation and Public Facilities (AKDOT&PF) uses liquid magnesium chloride (MgCl), salt, and sand to keep roads safe during icy conditions. The high cost of these treatments, in conjunction with stable or declining maintenance budgets, have emphasized the need to optimize the cost effectiveness of anti-icing and deicing activities. Currently, the timing of road treatment and rates of application of sand, MgCl, and salt are governed largely by operator experience and subjective judgment. AKDOT&PF decided to try advanced technologies to increase efficiency and cost effectiveness of its anti-icing and deicing activities in the Juneau area where weather conditions are extremely dynamic.

The AKDOT&PF Research Section hired ThomTech Design, Inc., a subsidiary of Force America, Inc. to help demonstrate the capability of mobile data collection and vehicle tracking technology in anti-icing. This project should provide information necessary to optimize anti-icing as well as snow and ice control efforts, potentially reducing maintenance costs. Similar efforts are underway in Anchorage. See ThomTech Designs' website at http://www.thomtechdesign.com/ak_dot.htm for details.

How does it work?

ThomTech Designs, Inc. connects mobile data computer (MDC) to the sprayer or spreader controller in the snowplow/spreader truck. Sensors for pavement temperature, air temperature, and plow proximity are connected to the MDC. The interface also includes a global positioning System (GPS) . As the truck moves about the road network plowing snow and spreading or spraying ice control materials, the MDC records the truck's position, speed, date, time, pavement and air temperature, and sand/salt/MgCl application rate. All data can be transmitted wirelessly or stored on a PCMCIA card for subsequent download to a central office computer. Figures 1 and 2 show the MDC and its connections.

Figure 1: View of Mobile Data Collector in a Snowplow

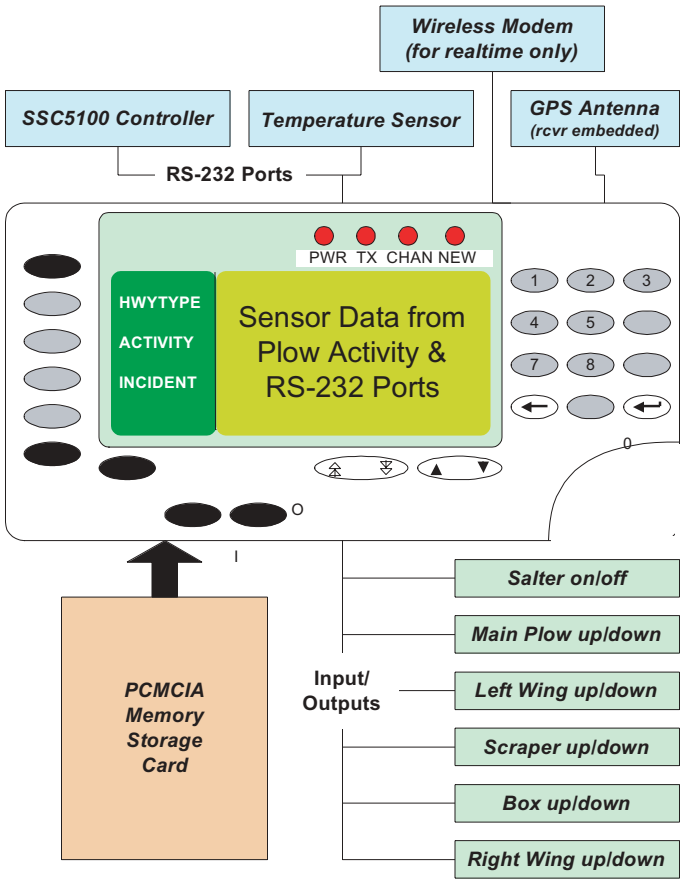


Figure 2: MDC Block Diagram with Sensor Connections

continued

Post - Treatment Evaluation:

To evaluate the effectiveness of the anti-icing and deicing operations, an evaluator travels the treated routes in a follow-up vehicle at various time intervals and records pavement condition observations by pressing icons on a ruggedized laptop computer screen. (See Figure 3.) This "evaluation laptop" computer records position, temperature, humidity, and time data automatically via a GPS receiver, and temperature/humidity sensors. Again, the evaluator can transfer this data to the centralized office computer wirelessly or via PCMCIA data card.

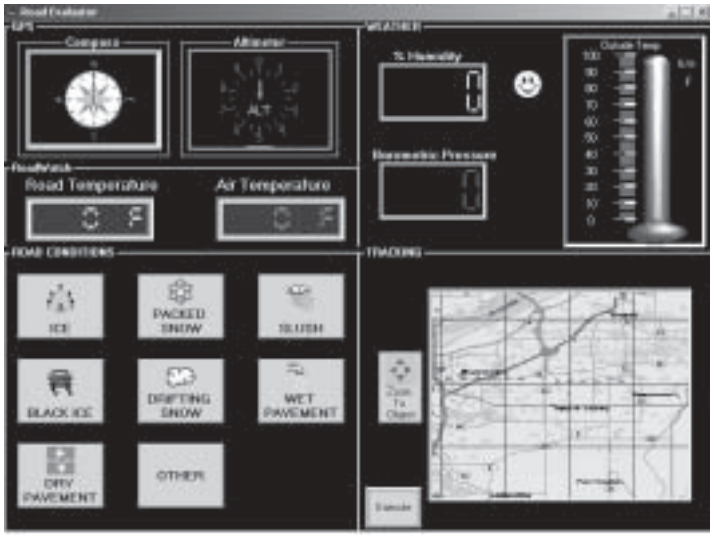


Figure 3: Screen Shot of Evaluation Software

In consultation with Southeast Region AKDOT&PF Maintenance staff, ThomTech Design, Inc. customized the evaluation software for the evaluator's laptop to record conditions typically found on roadways in Juneau Alaska. The research team decided to make evaluation descriptions as objective as possible, to provide a clear basis for decision-making. The evaluation laptop will also be connected to a digital camera to provide photographic documentation of road conditions. Additionally, the software will provide a warning to the driver of frost danger using the information from the pavement temperature and humidity sensors.

The evaluation software includes report generation software (dubbed SnowOwl by ThomTech Design, Inc.) that provides the evaluator with report preparation options including material and equipment usage reports. The reports have a standard format or can be customized by truck, start and end time, or sensor information. Figure 4 provides a screen shot of the report generation software package.

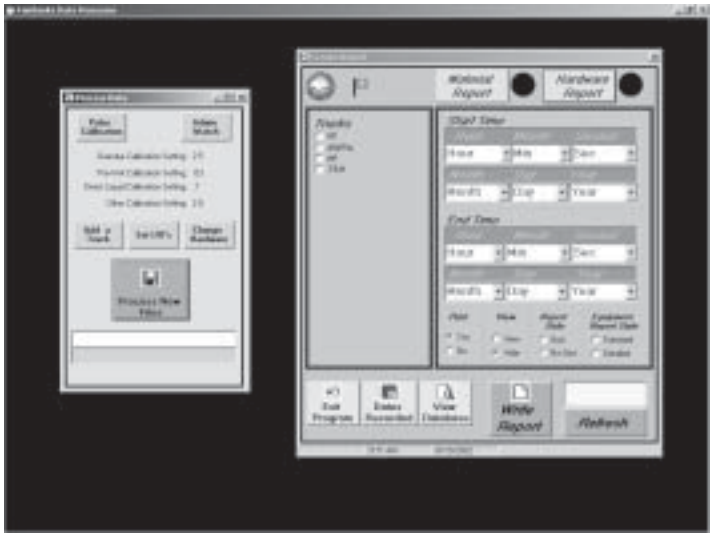


Figure 4: Main Screen for SnowOwl Report Generator

Pulling it all together - GIS

Once the data from the trucks and evaluation vehicle are transferred to the central office computer, AKDOT&PF intends to create a geospacial information system (GIS) with ESRI ArcView software to enhance visibility of the information and create a powerful decision-support tool. The software is capable of producing a color coded route map giving visual reference of routes, times, speed, temperatures, and material used, etc.

Status

One MgCl spray truck and 4 sander/salter trucks in Juneau were retrofitted with MDCs and sensors. An evaluation vehicle has been retrofitted with sensors and configured to accept the ruggedized evaluation laptop. Data collection began in early December.

Throughout the winter project, the data gathering and evaluation efforts on the anti-icing and sanding project should yield valuable information, ultimately optimizing snow and ice effects resources, enhancing safety through more precise application of materials, and by providing a higher level of service for anti-icing and sanding operations. For questions regarding this study please contact Clint Adler, AKDOT&PF Research Engineer (clint_adler@dot.state.ak.us).

The Road Side Menace – Vetch (Vicia cracca)

Adapted from *Vetch Infestations in Alaska* a report by Andrew Nolen, Agronomist, Alaska Plant Materials Center, Division of Agriculture, Department of Natural Resources. Funded by Alaska Department of Transportation & Public Facilities – Research Section.

Vetch (Vicia cracca) Photo © Markku Savela

Infestations of exotic weedy plant species are invading along Alaska's right-of-ways. One such weed, Vetch, has found a niche in fence rows, ditch banks and roadsides throughout South Central and Interior Alaska. Some 150 species (of vetch) are known, about 25 of which are native to the United States. Vicia cracca is the primary vetch species invading Alaska's right-of-ways.

Is vetch management necessary?

Vicia cracca is a weed of definite concern in Alaska. Many agencies within the state have been observing its spread over the last few decades. It thrives in areas of recent soil disturbance such as roadsides and waste places. The problematic aspects of infestations of Vicia cracca are associated with its climbing habit. It's tendrils cling to everything and proceed to climb up or pull down whatever is in reach. When growing undisturbed, vetch clings together forming large tangled mats that seem to be completely interconnected.

Based on observations, it currently poses no threat to undisturbed land, nor is it an agricultural pest or public safety risk. Beneficial qualities of vetch are its nitrogen fixing potential and attractive growth habit. Concern about potential movement into undisturbed areas is high, but no evidence has been found of such occurrences. Natural disasters such as forest fires could provide an excellent opportunity for vetch to move in where it may inhibit or slow down natural succession.

All indications are that vetch is spreading. Bureau of Land Management officials indicate a significant increase in the level of infestation in the Anchorage and Fairbanks areas over the past several years. Areas that had little or no evidence of vetch in the initial Mat-Su survey did have noticeable infestations the following year. The seedling year and the second year of growth do not amount to much foliage, but an explosion of growth occurs during the third year.

Vicia cracca should be included on a list of many weedy speciescausing problems through-out Alaskan right-of-ways. Discussions with industry professionals indicate many weeds are more pressing than vetch, especially white sweet clover, Canadian thistle, and sowthistle. An integrated management plan covering all undesirable plants along right-of-ways may be the best course of action for the Department of Transportation and Public Facilities. Monitoring plant locations and concentrations for consecutive years would indicate which species are the ones in need of control. A public awareness campaign to educate Alaskans with problem could drastically reduce proliferation of problem species.

What's my best vetch management strategy?

Mechanical control is best suited for management of vetch on right-of-ways. In agricultural plantings where vetch emerges from seed held over in the soil from previous cropping cycles, mechanical control is the preferred method. Mow infested fields before seeds are ripened. Plow and follow with a cultivated crop for one season. Vetch doesn't tolerate frequent harvesting, even 3 cuts of alfalfa is enough to wipe out most types. Cut plants near the base of their stem before the end of flowering, approximately June 20 to July 15. Consecutive year cutting should eliminate most

continued

plants. Mowing of roadsides only impacts the plants in the open ditch bank but not those climbing the trees on the edges. Hand brushing or pulling around trees and fences may be the only method possible to remove hard to reach plants.

Since seed can remain viable in the soil for many years, care should be taken during roadside maintenance not to disturb soils containing vetch in the buried seed bank. Successful control in an area can be undone by one pass with a snowplow if it disturbs the soil. Vicia cracca seed can also be transported in soils used for road construction and landscaping. Management of plant populations surrounding gravel pits and other material sources is recommended. Inspection of topsoil sources should be done in order to prevent transportation of seed to areas currently free of this weedy pest.

Vetch background

Vicia cracca is a perennial that reproduces from rhizomes in the soil and from seed. It has leaves with 7-10 pairs of leaflets and purple flowers. Seeds are formed in pods that pop open when ripe dispersing seed away from the parent plant. In a monoculture vetch grows about two feet tall, but with external support such as trees and fences it can reach 6 feet in height. Extremely drought tolerant and cold hardy, vetch adapts to all soil textures.

The following list gives distinct features of Vicia cracca that can be used to make a positive identification:

- 7 to 10 pairs of leaflets per leaf
- Trailing, vine like growth habit, usually forming a tangled mat or cluster
- Leaves terminating in tendrils
- Leaflets with non-distinct mid-vein
- Leaflets covered with silky hairs
- Flowering period form about July 1 until freeze up
- Bluish-violet or purple flowers
- Weak stem
- 15 – 40 flowers formed per cluster
- Seeds formed in pods similar to a pea

Photo © Markku Savela

Public involvement will be essential to the success of any management strategy since much of the infestation is present on or next to private land. Education on proper plant identification and control methods would enable the public to actively participate. Removal of plants from the most seriously infested areas would limit the source of material for future spread.

For more information contact Clint Adler, P.E., Research Engineer, Alaska Department of Transportation & Public Facilities

e-mail: clint_adler@dot.state.ak.us

phone: (907) 451-5321

The photos in in this article were taken by Markku Savela of Finnland. A great resource on the web is produced by him for any one interested in more information about many species of vetch and even the fauna that uses vetch for food. at:

Invasive Plants Workshop Grows Out of Roadside Invasion

By Marta Mueller

Integrated weed management (IWM) along Alaskan roadsides has been receiving interest from land managers in Alaska. Transportation corridors have long been recognized as areas that can harbor noxious and invasive plants and help them spread. In addition, native vegetation along roadsides can become weedy, requiring management. For example, overgrown willow can be a safety hazard by reducing visibility and increasing moose browse next to roadways. An integrated approach to weed management can help make road maintenance more economical while improving safety and beauty along Alaskan highways.

The Department of Transportation and Public Facilities has been working with the Cooperative Extension Service (CES) and the Alaska Committee for Noxious and Invasive Plants Management (CNIPM) to develop understanding of weed management in Alaska. Recently DOT&PF helped to sponsor the 3rd Alaska Noxious and Invasive Plants Management Workshop in Anchorage November 13 and 14. The event focused on bringing participants up-to-date on projects statewide, identifying weed management tools, and identifying research needs in Alaska. The workshop featured two out-of-state speakers, experts on weed management plans and weed free forage certification.

DOT&PF sponsorship helped bring national speaker Eric Lane to the workshop. Eric is the State

Weed Coordinator for the Colorado Department of Agriculture. He helped develop the Colorado publication "Creating an Integrated Weed Management Plan." Eric spoke to workshop participants on developing management plans.

Many states use the well developed practice of integrated weed management. Implementing a good IWM plan can make weed management more cost-effective while achieving rights of way maintenance goals and even make good neighbors of adjacent property owners. The basics include:

- Describe the property or management area, including land use
- Create an inventory and map of weeds
- Identify land management goals and weed management objectives
- Prioritize weed management objectives
- Select and integrate weed management techniques
- Monitor changes to evaluate progress

Further reading on the Colorado handbook "Creating an Integrated Weed Management Plan" is found at http://parks.state.co.us/cnap/IWM_handbook/IWM_index.htm.

DOT&PF participants at the November workshop included Clint Adler, Research Engineer from Northern Region and Kris Benson, Environmental Analyst from Juneau. They were in good company with over 80 other participants from federal, state, and local entities across the state.

Marta Mueller is a Program Assistant for the UAF Cooperative Extension Service. For more information on noxious and invasive plants in Alaska view http://www.cnipm.org.

Subsurface Drainage Systems

By: Charles G. Luedders, P. E.
FHWA Pavement & Materials Engineer

Water in the pavement structure has long been recognized as a primary cause of pavement distress. The three major factors in moisture distress in pavement are rainfall, heavy loads and the pavement section. Pavement engineers have no control over the rainfall or the loading. We only have control over the design and construction of the pavement section.

There are several sources of the moisture in the pavement structure. These are surface infiltration, rising groundwater, seepage, capillary action and vapor action. We have tried to prevent surface infiltration by sealing the pavement. Attempts to prevent other methods of infiltration include low void asphalt layers or other impermeable layers at the bottom of the pavement. These attempts have not prevented the infiltration of moisture into the pavement structure.

That has led us to attempt to remove the water from the pavement with a drainage system. These systems normally include a permeable base, a separator filter layer and a positive drainage system. An inspection of these systems in the 1990's in thirty States found only 33 percent of the drains to be performing properly. This is an alarming figure. A subsurface drainage system that is not performing will hold water in the pavement structure. This is a worse scenario than a pavement structure with no drainage system. The study also proved the availability of methods to inspect and maintain the drainage system.

Today, video systems to inspect drainage systems are available. These should be used for construction inspection and maintenance. The construction inspection application will insure that the drainage system survived the construction process. Follow-up use by maintenance will insure the continued performance of the drainage system and locate the areas needing maintenance.

Equipment has also been developed to maintain the drains. Water jetting systems can be used to remove soil, debris and roots clogging the drainage system. Drainage systems are now being designed in a loop system to force the water through the loop, and not down a continuous pipe in the trench. These advances have made maintenance of the systems possible, even when we can't see the drain from the surface. This technology can and should be used for other drainage systems such as under drains, not just subsurface pavement drainage systems.

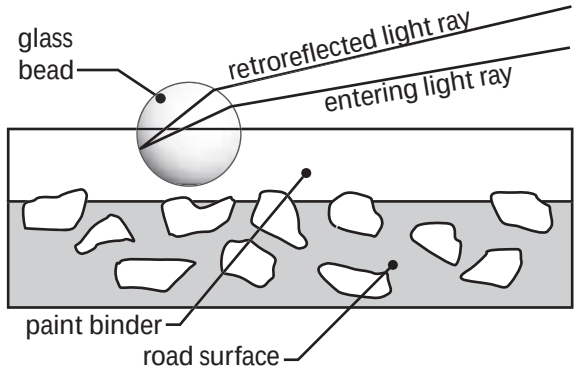
Drainage systems can help prevent moisture damage to the pavement structure. However, maintenance of the drainage system is key to its successful performance and should be considered in the design of the system. If we can't or won't maintain the drainage system, we shouldn't build the drainage system.

Chuck Luedders advocates proper drainage system placement and maintentance during the 2002 Asphalt Summit in Anchorage.

Pavement Markings: Microscopic Evidence of Paint Curing Process Leading to Reduced Retroreflectivity in Low-VOC Traffic Paints

By Kim Phillips and Clint Adler, AKDOT&PF Research & T2

The Alaska Department of Transportation & Public Facilities (AKDOT&PF) used a low-cost digital microscope to study glass bead retention in low volatile organic compound (low-VOC) traffic paints. Glass beads give traffic paints retroreflectivity. As illustrated in the diagram below, retroreflectivity is the ability of a surface to reflect light back to the light source.

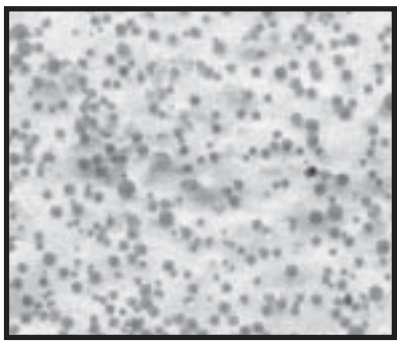


The nighttime visibility of pavement markings can be enhanced through retroreflectivity, which has become an increasingly important highway safety feature. Retaining glass beads on the paint surface is the most important aspect of maintaining a retroreflective stripe.

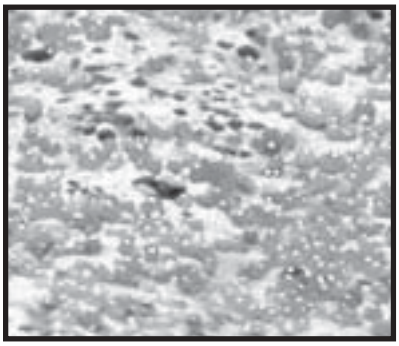
Glass Beads Under the Magnifying Glass

The AKDOT&PF Research Group used microphotography to examine glass bead adhesion to low-VOC paint applied to two asphalt-surfaced roads with moderate (approx. 3000 - 5000 vehicles per day) traffic volume. The photographs show glass beads tend to "pop out" of the paint as the paint cures. It appears that the paint shrinks and cracks during the curing process, stressing the bead/paint bond, and leaving beads in their original position with only the bottom 1/2 to 1/3 of the bead remaining below the paint surface. (See Photos 1,2, and 3.) This results in beads that are:

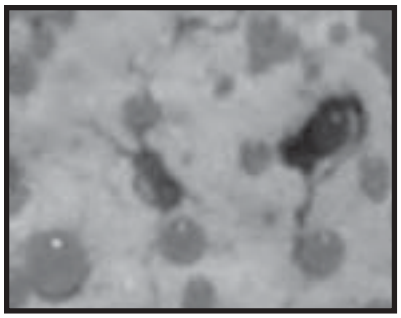
- weakly bonded to the paint, and
- almost completely exposed to traffic wear.



1) Top view of newly applied, uncured traffic paint. Similar to the bubbles you find in your milk. Note that the beads are only partially exposed.



2) Side view of week old traffic paint. Note darker areas where beads have been removed. Most surface beads appear to be almost completely exposed.



3) Top view of 2 week old traffic paint. Large beads pop out first, especially where cracks in the paint are forming.

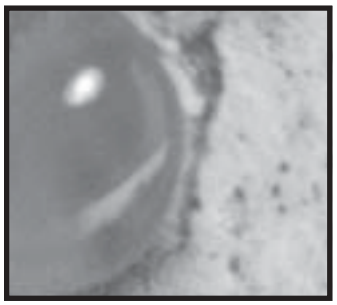
Problem: Paint Shrinks, Beads Do Not

Prior to studying these magnified photos, AKDOT&PF researchers assumed that poor bead retention was due mainly to poor chemical bonding between the bead surface and the cured paint. However, the photos reveal evidence that the bead-paint bonds are often strong enough to cause a thin layer of cured paint to adhere to the beads as the paint contracts and the beads "pop out" of the paint surface. At the bead-paint interface, the beads form strong bonds with the paint. Shrinkage of the curing paint forms concen-

Pavement Markings continued.

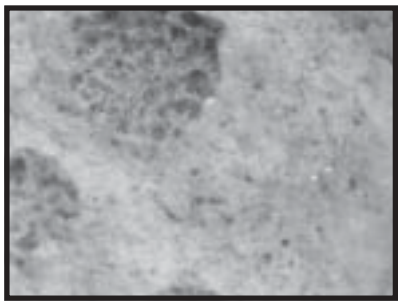
trated, localized stress at the bead-paint interface and in the cured paint very near the beads – in many instances actually initiating cracking of the paint near the bead. (See Photo 4.)

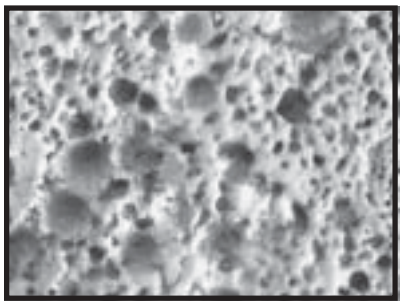
In this state, the beads are weakly attached to the paint surface and are vulnerable to removal by traffic exposure. During bead removal, some tightly bound paint may adhere to the beads leaving a pock-marked crater (See photos 5 & 6). This seems to suggest, aside from traffic wear, the shrinkage of the paint during the curing process (which may be 2 weeks or longer) may be one of the more significant causes of rapid retroreflectivity loss in low-voc traffic paints.



4) 200x top view: shows paint adhering to glass bead, which is "popping out" of the stripe. Note the crack in the paint next to the bead.

5) 200x top view: clearly shows cratering effect of paint being removed with the glass beads.





6)200x top view of 2 month old paint. Note that there are few beads left and many cavities are present where beads have popped out.

Rate of Bead Loss in Paint

The AKDOT&PF Research Group also examined the relationship between bead density (number of beads per square centimeter) and retroreflectivity over a 7 week period on the asphalt surfaced roads of moderate traffic levels. (See Table 1.) Retroreflectivity measurements and bead counts in this study were too

Average Reflectometer Reading mcd/m2/lux (using Flint Trading LTL 2000 Retroreflectometer)							
Farmers Loop-Begin on Day 2 (ADT approx. 3000 vehicles/day)					Parks Highway (ADT approx. 5000 vehicles/day)		
Straight Section			Curve Section		Begin on Day 8		
Date	Reading	beads/cm2	Reading	Beads/cm2	Date	Reading	Beads/cm2
7/9/02	326	258	360	256	7/9/02	295	200
7/15/02	232	248	157	212	7/15/02	235	265
7/22/02	308	226	231	315	7/22/02	202	146
8/5/02	292	228	201	184	8/5/02	210	188
8/28/02	125		128	105	8/28/02	205	145

Table 1. Retroreflectivity Measurements.

variable to solidly support any theory and the information gathered is not statistically significant. Yet the data generally suggested a good correlation between bead density and retroreflectivity, and that both decreased by roughly 30% over the 7 week period on straight sections and by roughly 65% on curved sections. Other factors not explored in this study are bead composition, percentage deformed or out of round beads, damage to beads, effects of deformed beads to adhesion to paint, paint quality, and installation quality.

Limitations and Future Research

The beads in this investigation are all non-coated glass beads, so the mechanics of silane coated bead retention presents another topic for micro-scale research which may improve our understanding of how and why beads aren't adequately retained in low-voc paint striping in Alaska. Additional research is also needed to improve the micro-scale interaction between durable pavement marking materials and various bead types.

Future studies could benefit from larger data sets to increase statistical significance and a more versatile microscope. This field study covered only three road striping locations. The first location was at a straight section of the Parks Highway (south bound) with ADTs averaging 3076 during the months of the study. The second location was on a south bound curved section of Farmers Loop Road and a straight section immediately preceding it, with an average ADT of 3234 during the months of the study. The researchers used an Intel QX3 microscope with 200x, 60x and 10x lenses, which limited resolution of fine details. In particular, efforts to focus on areas of the stripe which were more than slightly depressed were unsuccessful. In general, focusing was difficult due to sunlight obscuring the laptop screen. Because of the spherical nature of the beads, adequately quantifying deformities and fractures was problematic. So their contribution to lowered reflectivity values remains undefined.

Deep Injection Process Proven at Kuparuk River

The URETEK method successfully lifted the roadway several days ahead of schedule.

Immediate repairs were necessary on the Kuparuk River East Channel Crossing. Thaw settlement of the fill and sloughing of a steep shoulder caused portions of the roadway to settle up to 13 inches. Such a large subsidence was making it difficult to move large drilling equipment along the heavily traveled Spine Road and hampering access to the western oil fields. Phillips decided to lift the pavement and level the road.

The engineering firm Peratrovich, Nottingham and Drage, Inc., recommended the URETEK method and Swalling Construction, Inc. was awarded the contract. The URETEK method employs high density expanding synthetic resins (expanding foam) to fill, densify, and stabilize low density compressible soils. The process was used to gently lifted the slab six days ahead of schedule to the satisfaction of Phillips Alaska.

Only a few 5/8-inch grout holes remain as evidence of the project. A few times foam pushed through along the road shoulder, the contractor simply stopped pumping for five seconds while the foam formed its own seal. The excess was promptly removed and taken from the jobsite with no river contamination. Technical, environmental, and economic advantages showed URETEK's deep injection process was a good choice for this application.

Severe weather and grizzly bears made for an interesting job. "Weather was really bad, even for Alaska's North Slope", said Dave Brangan, URETEK Alaska Regional Manager, "As if the weather wasn't enough, one night the crew was watching for bears, we were alerted one was in the area, luckily he didn't bother us. In spite of these issues, we kept traffic interruptions to a minimum and the road was immediately available after the crew finished."

Deep injection was also used to stabilize the sloughing road sideslope under several rows of revetment. The revetment was raised in short order and gravels underneath amalgamated forming a water resistant barrier. Deep injection was utilized to attempt sub base densification for increased load bearing capacity.

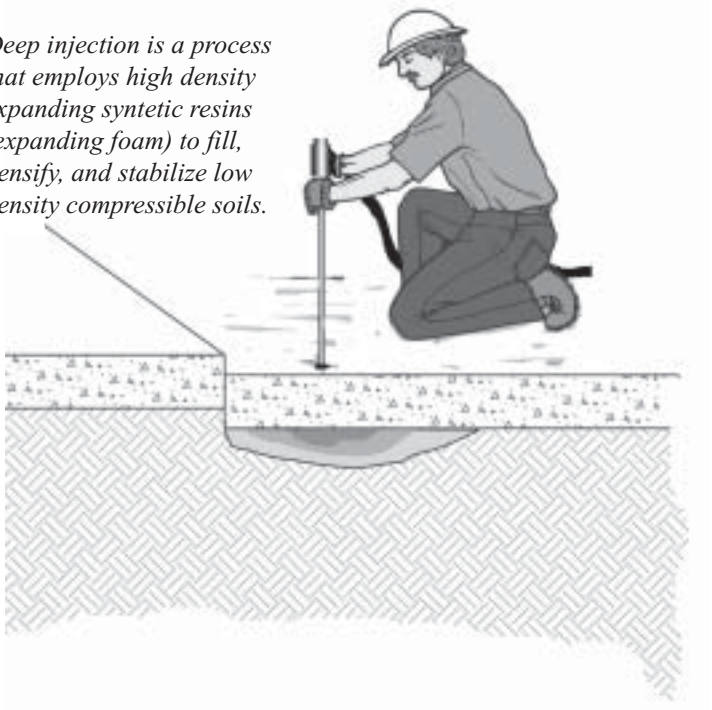
International

Contractors work to raise the revetment and stabilize the sideslope.

The deep injection process used by URETEK is virtually unknown in Alaska but has been around since 1978 throughout Europe and the contiguous lower 48 United States. Employing the use of patented polymer resins, the material when properly injected under concrete can exceed lifting pressures of 36,000 pounds per square foot while adding very little weight to stressed sub soils. It had proven its effectiveness elsewhere so was used as an alternate to pressurized standard cement grouting.

Various contractors were worried conventional pressurized grouting procedures may not perform adequately. Pressurized grouting requires confinement to lift properly - the close proximity of the road shoulder would likely allow grout to seep out. The URETEK method self seals areas where seepage occurs. Grout also requires a much longer set up time than injection, which would result in greater traffic disruption.

A product proven to stabilize concrete slabs, insulate, densify soils, is water resistant, environmentally inert and cost effective will continue to garner interest in Alaska.



Deep injection is a process that employs high density expanding syntetic resins (expanding foam) to fill, densify, and stabilize low density compressible soils.

For more information :

http://www.uretek.ca.

Training Calendar and Meetings & Events

January

Warrant Level I: Alaska Rules, Regulations, Policy and Procedure.
Fairbanks: January 8 (DOT & sister agencies only.)

Warrant Level IV: Contract Law I.
Fairbanks:January 13th
Anchorage: 16th
Juneau: 28th
(DOT &sister agencies only.)

February

Fundamentals of Geometric Design.
Anchorage: February 3-7

Warrant Level VI: Contract Law II.
Anchorage: February 11
(DOT & sister agencies only.)

March

AASHTO Leadership Institute
March 3-7

Advanced Geometric Design.
Fairbanks: March 3-7.

Warrant Level VI: Contract Law II.
Juneau: March 26
(DOT & sister agencies only.)

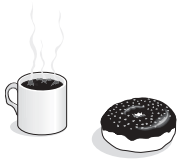
April

Advanced Geometric Design.
Anchorage: April 14-18

Warrant Level VI: Contract Law II.
Fairbanks: April 9
(DOT & sister agencies only.)

ITS Standards
Anchorage: April 9/10

For information about T2-sponsored training, contact Dave Waldo at 907-451-5323, david_waldo@dot.state.ak.us, or Simon Howell at 907-451-5482, simon_howell@dot.state.ak.us, or go to www.dot.state.ak.us, rest cursor on "Hot Topics," then click on "T2 Training."



Meetings Around Alaska

Society	Chapter	Meeting Days	Location & Contact	
ASCE	Anchorage	Monthly, 3rd Tues., noon	Northern Lights Inn	
	Fairbanks	Monthly, 3rd Wed., noon	Captain Bartlett Inn	
	Juneau	Monthly, 2nd Wed., noon*	Westmark Hotel	* except June–Aug.
ASPE	Anchorage	Monthly, 2nd Thurs., noon	West Coast International Inn	
	Fairbanks	Monthly, 1st Fri., noon	Captain Bartlett Inn	
	Juneau	Monthly, 2nd Wed., noon*	Westmark Hotel	* except June–Aug.
ASPLS	Anchorage	Monthly, 3rd Tues., noon	Executive Cafeteria, Federal Building	
	Fairbanks	Monthly, 4th Tues., noon	Ah Sa Wan Restaurant	
	Mat-Su Valley	Monthly, last Wed., noon	Windbreak Cafe	George Strother, 745-9810
AWRA	Northern Region	Monthly, 3rd Wed., noon	Rm 531 Duckering Bldg., University of Alaska Fairbanks	Larry Hinzman, 474-7331
ICBO	Northern Chapter	Monthly, 1st Wed., noon	Zach's Sophie Station	Jeff Russell, 451-5495
ITE	Anchorage	Monthly, 4th Tues., noon except July & Dec.	Sourdough Mining Co.	Laune Koziesek, 343-8145
IRWA	Sourdough Ch. 49	Monthly, 3rd Thurs., noon**	West Coast International Inn	
	Arctic Trails Ch. 71	Monthly, 2nd Thurs., noon**	Oriental House	
	Totem Ch. 59	Monthly, 1st Wed., noon	Mike's Place, Douglas	** except July & Dec.
Asphalt Pavement Alliance	Alaska	3rd Wednesday of every other month	varies	John Lambert 267-5294
PE in Government	Anchorage	Monthly, last Fri., 7 a.m.	Elmer's Restaurant	
Society of Women Engineers	Anchorage	Monthly, 1st Wed. 6:30 p.m. except July and August	varies	Karen Helgeson, 522-6513

2002 Asphalt Summit Hailed a Success

Over 100 contractors, DOT & PF Employees, and consultants gathered to discuss issues related to asphalt and drainage at the 2002 Asphalt Summit in Anchorage, November 13-14.

Several presentations provided a framework for conversation. Stimulating discussion was the result of Dr. Lutfi Raad's presentation on "Effects of Fines in Alaska Roads". Dr Raad's research showed a small increase in fines results in a large decrease in strength. Several summit participants saw this as a significant statement and were even more impressed with the conversations the idea stimulated.

This years summit also included a drainage course " Construction of Pavement Subsurface Drainage Systems." This course provided an opportunity for attendees to learn more about the design of drainage systems, specifically in removing water from under the subsurface and out of the embankment.

The Asphalt Summit is an annual event providing an opportunity for contractors and state employees to talk about the issues of the day. Contractors, suppliers, researchers, and DOT & PF engineers and administrators had opportunity to outline expectations, present recent technologies, and discuss new policies. There was also opportunity for contractors to voice concerns or make suggestions on State operations.

Asphalt Summit presentations may be viewed at the DOT web site:

http://www.dot.state.ak.us/stwddes/research/02summit.html

http://www.dot.state.ak.us
- click on "Hot Topics QuickLinks"
- click on T2 Training

This newsletter is funded by the Federal Highway Administration and the Alaska Department of Transportation and Public Facilities. The material contained herein does not necessarily reflect the views of the Alaska Department of Transportation, Federal Highway Administration, or the T² staff. Any reference to a commercial product or organization in this newsletter is only for informational purposes and is not intended as an endorsement.

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